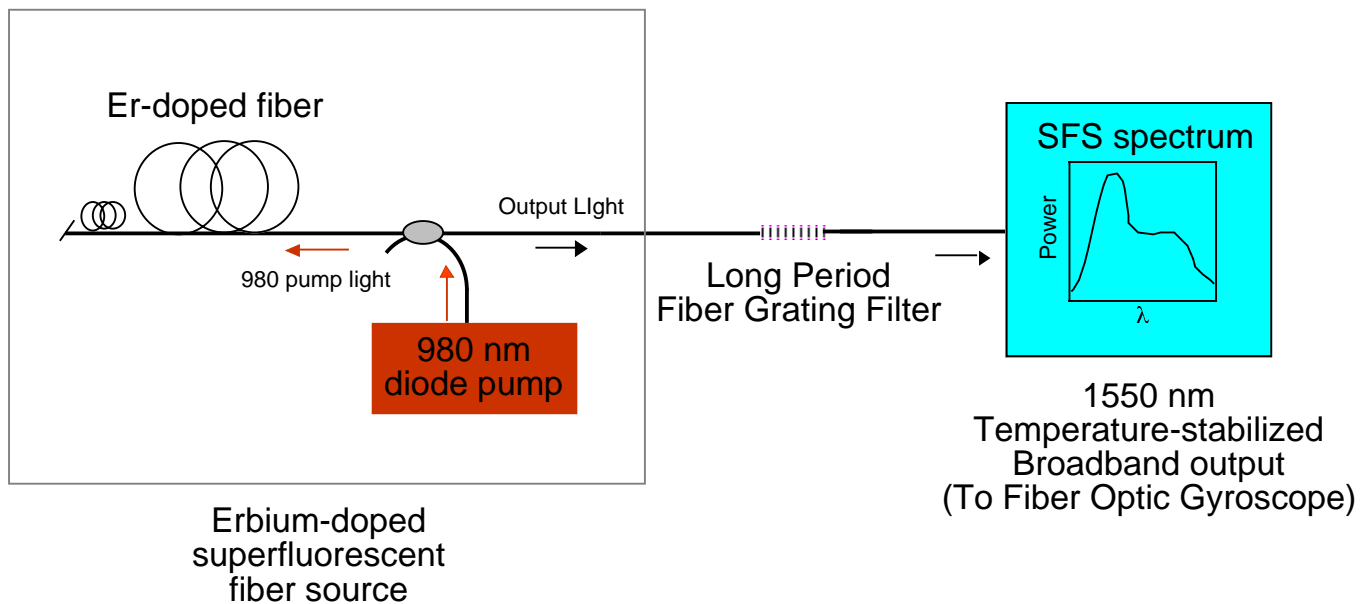


LONG-PERIOD FIBER GRATING FILTER FOR STABILIZATION OF ERBIUM-DOPED SUPERFLUORESCENT SOURCE



The Naval Research Laboratory has developed a method for compensating temperature-induced changes in the mean wavelength of an erbium-doped superfluorescent source using a temperature-sensitive long-period fiber grating to filter the source. This provides a broadband fiber optic source with a highly stable mean wavelength. We have demonstrated a 100-fold reduction in the intrinsic temperature sensitivity of an erbium-doped superfluorescent source using this technique. This technology will enable the production of navigational grade fiber optic gyroscopes using very modest temperature control of the light source.

Use of a long-period fiber grating filter provides a significant increase in source stability beyond that provided by traditional methods of reducing the temperature sensitivity through optimization of fiber length, pump power and pump wavelength. Other advantages of the technique include:

- All fiber optic construction: filter fabricated in standard fiber and fused to source
- Small size: filter 2 cm long
- Compatible with existing architectures: filter is attached at source output
- Low backreflection: < -80 dB typical filter reflection
- Versatility: filters with broad range of temperature sensitivities available for compensation of wide range of sources
- Passive operation: filter is a passive fiber grating device

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